

grow to 9.8 million by 1998. The days when residential customers were satisfied with "Plain Old Telephone Service" are clearly behind us.

In quantifying the user benefits from increased investment in the public network, Dr. Vanston limits his analysis to two broadly defined services: Integrated Services Digital Network (ISDN) and Public ATM-Switched Multimedia Services (PAMS). Both of these technologies are based on international standard user interfaces and protocols; will offer economical access to the mass market; will stimulate a host of new communications and information applications; and will spawn the development and purchase of associated hardware, software and services.

ISDN requires LEC investment in digital switches, generic switch software and "line cards," which connect local loops to the switch. PAMS requires massive changes in all major categories of network investment, including: upgrading to ATM switches; deploying Synchronous Optical Network (SONET) transmission equipment; and replacing existing copper-twisted pair with some combination of optical fiber and coaxial cable. The increased investment in the public network will accelerate the deployment of both ISDN and PAMS, in Dr. Vanston's estimation, by about one to two years, which, he notes, can make a crucial difference in the market viability of new technologies. Dr. Vanston then translates this acceleration in technology deployment into a "quality index for digital communications," which is constructed to estimate the gains in user productivity, cost savings and service quality enhancements.

## **11. Macroeconomic Benefits of LEC Price Cap Reforms**

The WEFA Group conducted an economic impact analysis of revising the interstate price cap formula, using WEFA's integrated and consistent large-scale econometric models of US macroeconomic and industry economic activity. The analysis incorporates carefully researched assumptions regarding the expected future course of the telecommunications services industry under the current regulatory regime and under an alternative, revised price cap formula regime based on the USTA proposals. The WEFA analysis relies on the Darby report for expected differences in telecommunications industry investment and the Vanston-TFI report for projected improvements in service quality and the rate of economy-wide technology implementation. These changes are used to simulate the benefits of price cap reforms throughout the economy over the next ten years.

The enhanced model yield two sets of forecasts through the year 2004. The first forecast represents WEFA's standard long-term forecast of economic activity in the United States. (This is referred to as the Baseline forecast throughout the report.) In WEFA's Baseline forecast, the economy grows steadily in real terms through 2004. During the first three years, forecast growth averages 3.2% per year. Thereafter, growth averages 2.6% per year. Total real Gross Domestic Product (GDP) exceeds \$8.7 trillion in constant 1994 dollars by 2004.

The second forecast quantifies the impact of implementing a revised price cap plan for LECs' interstate access services. The greater pricing flexibility and improved risk-reward factor provide incentives for the LECs to accelerate investment and, thereby, improve service quality at a faster pace. In response, businesses and households adopt enhanced telecommunication services sooner than in the Baseline forecast, yielding a slightly faster rate of technological change over the forecast period. The acceleration in enhanced telecommunications technology deployment and service quality result in an increased use of telecommunications services by all sectors of the economy, leading to increases in technological change and productivity. As a result, the economy grows faster than in the Baseline case, to \$8.8 trillion in 2004, an increase of \$60 billion in that year.

**Employment Benefits:** With the revised price cap formula, the economy gains 510,000 additional jobs over the next ten years. The additional jobs are spread throughout the economy, with all major industry groups participating in the benefits. The broad services sector gains the largest number of jobs due to the availability of enhanced, broadband telecommunication services.

**Economic Growth Benefits:** The new regulatory environment adds \$60.5 billion to total gross domestic product by 2004 compared to the Baseline forecast. Over the ten year interval, the cumulative gain in real GDP is \$278 billion. Among the major components of GDP: personal consumption expenditures gains a cumulative \$148 billion, resulting in \$30 billion higher expenditures in 2004; business fixed investment increases \$69 billion over the ten years, \$14 billion higher in 2004; residential investment rises by a total of \$28 billion during the forecast period, ending \$6.6; and exports gain a cumulative \$28 billion while imports increase by \$12 billion, resulting in a significant improvement in the balance of trade. The federal budget deficit improves by \$149 billion total ending \$33 billion lower in 2004, relative to the baseline forecast.

**Consumer Benefits:** Due to the efficiencies gained throughout the economy, the annual rate of inflation (as measured by the Gross Domestic Product deflation) is 0.15 of a percentage point lower on average per year over the next ten years. In total, the price level is 1.4% lower in the Price Cap simulation than in the Baseline forecast by 2004. Consumer price inflation sheds 0.18 of a percentage point on average per year over the next ten years. As a result of lower inflation, consumers save \$136 billion in real terms on their total purchases in 2004. Cumulatively, total savings on consumer expenditures for the ten years is \$582 billion. At the same time, real disposable income is \$30 billion higher in 2004, with the revised price cap forecasting a \$145 billion increase in real disposable income over the next ten years.

## **12. Summary and Conclusion**

Dramatic, accelerating changes in telecommunications technologies, market demand and competition require corresponding changes in the price cap regulation of interstate access services. This proposition is based on the principle of "environmental fit," namely that successful public policies must be responsive to

current and expected industry conditions and be capable of adapting to and with further developments in the industry. The current regulatory regime for interstate access is becoming an obstacle to balanced competition, market-response pricing and new service offerings. In contrast, the powerful economic incentives and competitive safeguards in USTA's proposed price cap plan can promote the development of healthy competition and expedite the deployment and adoption of new telecommunications technologies and services.

Because telecommunications has become so vitally important to economic development in the information age, regulatory policies must place greater weight on economic efficiency, innovation and investment incentives. The price regulation plan proposed by USTA represents a significant improvement over the Commission's current LEC price cap plan. Adoption of the USTA plan will generate substantial benefits to telecommunications customers and to the US economy. At the same time, failure to act progressively now will surely delay the tremendous potential benefits of the National Information Infrastructure. Unless freed to compete by pricing flexibly and offering new services expeditiously, and given appropriate economic incentives, capital market discipline will reduce LEC investments in the public telecommunications network. Such regulation-imposed delay in making the transition to full competition would cause a permanent loss of economic benefits.

As it addresses the need for access reforms, the Commission should consider three major factors. First, the Commission should also realize that, in constructing a good price cap plan, parsimony and simplicity should be very high priorities. Adding terms and conditions, contingencies and exigencies, unduly complicates the understanding and administration of a plan. Each element of price cap plan should pass a test of essentiality: is it really necessary or can we get along without it? Each element should also pass a stiff cost-benefit test: will the benefits of including the provision clearly exceed the costs of administering it, including the costs it imposes by dampening incentives for efficiency and innovation?

Second, the Commission should be wary of arguments that emphasize the risks of change and, therefore, the need to continue elements of rate of return regulation in a rapidly changing environment. Such arguments are not surprising since they reflect the power of the emotional and institutional status quo. Whatever the risks of change in regulatory policy may now be, however, the risks of not making a substantial change are far greater. If we cling too long to the past, we harm our own future. The status quo offers some comfort, because we know it so well -- or at least think we do. What we actually know is how the current policy has worked in the past. We do not know at all how it will work in the future. Yet the comfort and familiarity of the status quo too often prevent institutions from changing their policies and practices in response to, much less in anticipation of, changes in their environments. The Commission should continue its leadership in telecommunications by taking the next logical step by adopting a simplified, pro-competitive, pure price cap plan in this proceeding.

Third, the Commission should not underestimate the market signaling effects of its decision in this proceeding. The mass media and business press are full of reports of

the Administration's pronounced commitment to the "information superhighway." Actions, though, speak ever so much louder than words. Few actions, by any government agency, will have a greater effect on perceptions of investors, competitors and telecommunications customers, or will speak more to the point, than the Commission's decision in this proceeding. Capital markets are, by their very nature, forward-looking; hence investors and investment managers are looking forward to this decision as an indicator of the extent to which the Commission will actually adopt the principles enunciated as crucial to the National Information Infrastructure.

**ATTACHMENT 2**

**Economic Benefits of LEC Price Cap Reform**

by

**Robert G. Harris**

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# **ECONOMIC BENEFITS OF LEC PRICE CAP REFORMS**

by  
Professor Robert G. Harris  
University of California, Berkeley, and  
Law & Economics Consulting Group, Inc.

in support of the  
**United States Telephone Association**

May 9, 1994

## **Federal Communications Commission**

Notice of Proposed Rulemaking

In the Matter of  
Price Cap Performance Review  
for Local Exchange Carriers  
CC Docket No. 94-1

## I. Introduction

Since the adoption of the current price cap regulation of Local Exchange Carriers just four years ago, this Commission has observed truly remarkable changes in the telecommunications industry. While competition is growing rapidly in nearly every market for telecommunications services, the rate of growth of access competition has been most astonishing. Competitive access providers, interexchange carriers, cable television operators, satellite systems providers and customers themselves have entered and rapidly expanded their access services facilities and capabilities.

Yet, as powerful and compelling as these competitive developments are, the Commission addresses the reform of access price regulation in an even broader context: the development of the National Information Infrastructure (NII). Much to their credit, the Clinton Administration, the Congress, and the leadership of the Commission have committed to adopting policies that will accelerate the development, deployment and diffusion of advanced telecommunications services and regain global technological leadership for the United States in these critically important industries. In asserting its commitment to the NII, the Administration has acknowledged the growing importance of telecommunications to the national welfare:

"Information is one of the nation's most critical economic resources, for service industries as well as manufacturing, for economic as well as national security... In an era of global markets and global competition, the technologies to create, manipulate, manage and use information are of strategic importance for the United States. Those technologies will help U.S. businesses remain competitive and create challenging, high-paying jobs. They will also fuel economic growth which, in turn, will generate a steadily-improving standard of living for all Americans."<sup>1</sup>

As important as the NII is to the nation's economic and social welfare, though, it is widely recognized the government cannot, and should not, expend large sums of scarce public funds to build the information superhighway. While targeted public subsidies to facilitate and accelerate particular needy or valuable early adopters might be justified, the major role of the government is stimulating private investment in the NII. This proceeding, as much as any pending before the Commission, presents a test of that commitment. Private investors — including LEC shareholders — will not risk their savings unless they are assured that the potential rewards are worth the risk: the government should not expect that wishing for private investment will make it happen. Neither, though, is it an impossible task for the government to attract sufficient private investment in the information infrastructure. What is needed is simple and straightforward: a set of adaptive and flexible policies that facilitate balanced competition, that promote efficiency and innovation, and that provide

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<sup>1</sup> "The National Information Infrastructure: Agenda for Action," Information Infrastructure Task Force, September 15, 1993, page 5.

appropriate economic incentives for investment. As articulated by Vice President Gore:

"...for the private sector to invest and for initiatives opening a market to competition to be successful, it is necessary to create a regulatory environment that fosters and protects competition and private sector investments, while at the same time protecting consumers' interests."<sup>2</sup>

The purpose of this report is to assist the Commission in addressing the issues raised by the NPRM and to encourage it to adopt progressive access policies that will achieve the Commission's policy goals and serve the nation's interests in a healthy, vibrant telecommunications sector. In this proceeding, Commission has an historic opportunity to make a substantial contribution toward these ends. The Commission should seize this opportunity to:

- increase incentives for LEC investment in the NII by ending earnings regulation (eliminate sharing, low-end adjustment and depreciation prescription) and removing obstacles to new service offerings;
- increase incentives for LECs' efficiency and innovation by adopting a realistic productivity offset;
- ensure that all customers benefit from growing competition in access services by using forward looking measures of competition, granting LECs increased pricing flexibility and reducing regulatory disparities between LECs and other competitors.

Appendix A provides evidence in support of the growing importance of telecommunications to productivity, economic growth and development, and the competitiveness of U.S. workers and enterprises in global markets. As detailed in Appendix A, spending on communications constituted 6.1% of GNP by 1989 and the combined output of the information industries will rise from 16% of GNP in 1991 to 20% in the year 2000. LECs also provide a major share of total investment in the nation's information infrastructure (\$21 billion invested by LECs, or 76% of the \$28 billion total invested by all carriers in 1992). The intensity of telecommunications usage has been growing at an annual rate of 3%, with the eight most intensive user industries producing nearly half of total US output of goods and services. Increased use of telecommunications services has had an enormous impact on aggregate productivity growth, contributing 25% of the total realized in the US economy from 1975 to 1991.

Recent studies have found very strong linkages between telecommunications investment and economic growth and development at the national, state and local levels. In recognition of these impacts, many of the United States' leading global

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<sup>2</sup>Text of speech by Vice President Albert Gore, Jr. for delivery March 21, 1994 at a meeting of the International Telecommunications Union in Buenos Aires, Argentina.



competitors have targeted telecommunications as a "strategic industry," adopting progressive public policies to accelerate more rapid development and deployment of telecommunications technologies. As a consequence, the US can no longer merely presume it will continue its international leadership in telecommunications. Affirmative public policy changes are needed, to unleash the full power of market forces and realize all of the potential of new telecommunications technologies.

Section II of this report explores the dramatic changes in telecommunications industry conditions, especially rapid technological innovation, dramatic shifts in the composition of demand for telecommunications services, and the emergence of competition in telecommunications in general and access services in particular. This section is intended to show that the current price cap plan, however appropriate it may have been when it was adopted, is no longer consistent with the current industry environment, much less future conditions in telecommunications.

Section III assesses the implications of these changing conditions for the Commission's policy objectives, as they relate to price cap regulation of LECs and related access policies. It also offers a set of principles the Commission might employ in the design, evaluation and implementation of price cap reforms. Section IV highlights the salient features of, and provides the economic rationale for, price cap reforms and related proposals by the USTA, in response the NPRM's baseline issues, with Section V addressing the transition issues.

## **II. Changing Conditions in Telecommunications and Access Services**

Good public policies are contingent upon the conditions in which and to which the policies are applied. Hence, this section reviews the changing conditions in telecommunications in general and access services in particular: accelerating technological change; changing composition of demand for telecommunications services; and the emergence of competition and strategic alliances among competitors. Appendix B provides an extended discussion and empirical description of the changing composition of demand and competitive conditions in access services. This section also evaluates the significance of competition that is "targeted" at the most intensive users of access services.

### **A. Dynamics of Accelerating Technological Change in Telecommunications**

Technological change has become a pervasive force in telecommunications equipment, telecommunications services and telecommunications-usage-intensive industries because innovation and adoption are occurring at a breath-taking rate. The potential for new services and new uses of telecommunications services borders on the unimaginable.

There are three important classes of technological change affecting the industry: those "inside" the industry, those in other communications media, and those at the user/customer level. First, after many years of steady, but incremental, technological innovation and adoption in telecommunications, there has been a

virtual explosion of technology in the use and provisioning of telecommunications services in the past decade. Along with computers, telecommunications is on center stage of the microelectronics revolution: the application of transistors, semiconductors, integrated circuits and other microelectronics in telecommunications equipment has dramatically reduced switching and transmission equipment costs, improved the quality of service and generated a host of new services and capabilities in the public telecommunications network (PTN). Second, contemporaneous with these changes in the wireline telephone network, technological developments in radio communications, including microwave, satellite, terrestrial broadcast radio and television and cellular telephone have dramatically lowered the cost, improved the quality and proliferated a wide range of wireless communications services. It is also only a matter of time before the coaxial wireline (cable TV network) will be upgraded technologically to provide point-to-point telecommunications services.

Economic studies have consistently found that "early adopters" (who are not necessarily the "wealthy few") play a crucial role in technology diffusion. Early purchasers of personal computers, for example, generated the demand for continuing technological progress that has brought the power of PCs to millions of American families — one-third of all households at last count. Even when consumers do not directly use new technologies, though, that does not mean they do not benefit from them. Very few households buy high speed data communications services, for example, but everyone benefits through faster credit card approvals, the ready availability of automated teller machines and other services which depend on high speed data communications. Moreover, consumers are also workers, and new communications technologies have made a substantial contributions to productivity gains in the U.S. economy. Retired persons also benefit, because the nation's ability to provide social security and health care benefits ultimately depends on the productivity of the American workforce.

Through microelectronics, the digitization of telephone switching has made possible many new services and reduced the costs of enhanced services. Digitization and optical technology in interexchange transmission, interoffice trunking and cable TV distribution systems have reduced the costs of those services and created entry opportunities for competitive access providers such as MFS and Teleport. There is every reason to believe that rapid technological changes in both wireline and wireless telecommunications and in communications applications will continue into the indefinite future, because the microelectronics revolution shows no sign of letting up.<sup>3</sup> There are four critical implications of technological innovation for the evolution of the telecommunications industries and the design of public policies.

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<sup>3</sup> Continuing technological gains may enable LECs to improve productivity at historic rates. It should be noted, though, that the significant productivity gains of the past decade year derived in large part from the deployment of optical fiber in transmission facilities and the replacement of analog with digital switches, both of which replacement processes are nearing completion.

First, rapid technological change has drastically reduced the expected lives of telecommunications investments. According to the "full life cycle" measure of equipment lives (time of first deployment to out of system), the economic lives of switches have decreased dramatically:<sup>4</sup>

Step-by-Step Electromechanical	87 years
Crossbar electromechanical	66 years
Analog Stored Program Control	35 years
First Generation Digital	25 years
Upgraded Digital (ISDN)	20 years

By another measure of asset lives, "time between generations" (50% usage of one technology to 50% of the next generation technology), switch lives have fallen thusly:

Electromechanical	40 years
Analog Stored Program Control	9 years
First Generation Digital	10 years
Upgraded Digital (ISDN)	4 years

These dramatic reductions in asset lives increase investment risk and require much faster amortization of capital investments.

Second, because the actual course of technological change is so unpredictable, business risk increases substantially due to the threat of early technological obsolescence, or the sudden rise of unexpected competitors enabled by a technological breakthrough. When making capital budgeting decisions, LEC managers must incorporate these risks, and weigh them against the expected returns on the investment alternatives. Sudden technological change especially increases risks of long-lived investments, because they might become technically obsolete before they have been fully amortized.

Third, technology is a powerful force that will ultimately overcome regulatory obstacles in its path — but at a cost. While regulations cannot, ultimately, stop the forces of technological change, they can and do affect the paths of these developments, whether for better or for worse. Of particular concern are policies that distort competitive dynamics or technological developments by handicapping incumbent regulated firms vis à vis entrants using new technologies. As the risks of discontinuous change rise, it becomes all the more important for regulators to create an even playing field and allow market forces to pick winners and losers.

Fourth, given the rate of technological change and the inertial energy of the status quo, public policies tend to lag behind market and technological developments. A "wait and see" attitude guarantees that public policies never catch up, much less keep up with changing conditions in the marketplace. In short, rapid technological

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<sup>4</sup>Lawrence K. Vanston, Bruce R. Kravitz and Ralph C. Lenz "Average Projection Lives of Digital Switching and Circuit Equipment," Technology Futures Inc., March 1992 (updated April 1994).

change and emerging competition make it imperative that regulators adopt policies that are forward-looking, technology-neutral and pro-competitive.

#### B. Changing Composition of Demand for Telecommunications Services

The "composition of demand" refers to the changing mix of services demanded by customers. Demand for communications services is shifting from analog voice to digital data/video, especially among business users in industries that rely on information for competitive success. Technological change is dramatically reshaping the use and users of telecommunications services, as the industry moves rapidly from predominantly voice applications to data, image and video applications. The number, size and sophistication of communications applications are increasing rapidly, as large and small business users and advanced residential users become more demanding customers. As the demand for sophisticated telecommunications applications has grown, large business users have developed specialists in managing and purchasing telecommunications services. In just the past ten years, more than half of the "Fortune 500" and thousands of medium and smaller enterprises have created a "Chief Information Officer" position, to whom a range of computer, communications and information experts and analysts report. With intimate knowledge of the technical and economic alternatives, these buyers continually seek out and exploit small differences in prices and have the capacity to assemble integrated systems from purchased "piece-parts." This means, in turn, that when regulated prices differ markedly from market realities, buyers will turn to more market responsive alternatives.

Even among residential users, there are rapidly growing demands for advanced telecommunications and information services. With one-third of the U.S. workforce engaged in "work at home,"<sup>5</sup> and with personal computers in nearly one-third of American homes, it is simply no longer true that residential customers will be satisfied with, nor would the nation's economy be well served by "plain old telephone service."<sup>6</sup>

The rapid growth in the use of computers, data and transactions processing systems (e.g., electronic funds transfers, credit card verification, Automatic Teller Machine networks, travel reservation services) has induced demand for data

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<sup>5</sup> "Total homeworkers (people who do at least eight hours of job-related work at home each week) are estimated at 40.8 million (up 4.6 percent from 1992), which is 32.7 percent of the US labor force; total homemaker households are 33.5 million, up 4.4 percent from 1992." "LINK's 1993 data shows steady work-at-home growth - and a few surprises" in Telecommuting Review: The Gordon Report 10(6), June 1993, p. 11.

<sup>6</sup> "The home market so far this year has been hot. PC penetration into the home jumped to 31% from 26.6% a year earlier - the biggest annual increase since analysts began tracking the market. LINK Resources Corp... predicts that five million PC's... will be shipped to American households this year." "This Time, PC Makers Vow, Home Models Will Be Easy and Useful as well as Cheap," Wall Street Journal, August 26, 1993, p. B1.

communications services, which is growing much faster than voice communications. With recent developments in computer graphics and image processing and storage systems, it is becoming evident that data will be superseded in the near future by images as the fastest growing share of communications traffic (e.g., American Express used to first keypunch data from credit card transactions, then move those data electronically from place to place; it now takes a "picture" of the credit receipt and moves the image from place to place). These changes from voice to data and image communications explain the need for and use of broadband transmission media.

The "composition of demand" also refers to the way in which the demand for telecommunications services is distributed across customers and classes of services. If every customer consumed a like amount, demand would be homogeneous. Then, in order for a new entrant to gain ten percent of the incumbent's business, it would have to compete away ten percent of its customers. In telecommunications services, in contrast, the distribution of revenues is highly concentrated: a small percentage of customers, lines and geographic areas account for a very large share of the revenues in most service categories because the intensity of access and usage varies dramatically across customers and space. In addition, the density of customers varies dramatically across space: that is, the most intensive customers tend to be highly concentrated geographically. Because demand has also become very highly concentrated, entrants with geographically limited networks can reach a very substantial share of access revenues. Business customers located in just 1% of the total land area served by LECs in ten large states constitute 30% of total LEC revenues; 75% of total revenues are located in just 8% of the land area.<sup>7</sup> It should also be noted that, because user demands are so highly concentrated in telecommunications services, one of the most important forms of competition is "self-supply" or "contract carriage" by large, intensive users.<sup>8</sup>

Because revenues are highly concentrated in access, exchange and interexchange services, these markets are easily segmentable and targetable. A rational competitor does not need to serve all geographic or customer segments to compete effectively in one or a few segments. Instead, the rational entrant will target its initial entry at the small share of the customers who account for a large share of revenues. Moreover, although the Commission has allowed LECs to deaverage their prices to a small degree, there are still customers with very different costs of service who pay the same prices. Hence, profitability is even more highly concentrated than revenues, since the highest volume customers and those in the most densely populated areas are also, typically, the lowest cost customers.

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<sup>7</sup>See Appendix B for further explanation and empirical support.

<sup>8</sup>While there is nothing inherently wrong with the rapid growth in private networks, there is reason to believe that at least in some cases, they are stimulated by regulations that require uneconomic pricing and/or inhibit the offering of new services by the local exchange carrier. In those cases, self-supply through private networks is contrary to economic efficiency and other public policy objectives.

Whereas a LEC has an obligation to serve all customers, entrants and competitors can and do target their investments, facilities, operations and sales/marketing efforts at these market segments with the highest expected returns.

### C. Competition in Access Services

Dramatic changes have occurred on both the demand side and the supply side of telecommunications markets. On the supply side, local exchange carriers faced very limited competition for local network access as little as ten years ago. Today, traditional local telephone carriers face competition from a host of competitors and potential competitors: competitive access providers, interexchange carriers, cellular carriers, cable TV carriers, and soon, personal communications services providers. Even small businesses and residential users have an increasing array of alternatives to LEC service offerings.

Technological advances are lowering the cost of entry into telecommunications, generating a proliferation of new communications services, increasing intermodal competition among alternative technologies, such as cable, wireline and wireless telephony. Actual competition has emerged in many significant segments of access and local exchange services, especially in urban areas, where population densities and demand intensities make selective entry most attractive to alternate service providers. It is important to recognize that it is principally technological innovation that makes increasing competition in telecommunications both possible and inevitable. It was the advent of microwave transmission that made it possible for a new entrant like MCI to enter the long distance business and compete with AT&T, whose network included a substantial portion of obsolete technology, copper wires on poles.<sup>9</sup> Similar dramatic breakthroughs in radio communications technologies are making possible increasing competition between wireline and wireless service providers. This is not to say that public policies have not played an important contributing role,<sup>10</sup> but that absent technological change, pro-competitive policies would have had little positive effect on competition.

Competitive access providers (CAPs) are competing aggressively in access services in urban markets. By successfully targeted the most profitable geographic areas and customers, CAPs are growing at extraordinary rates. The success of CAPs to date and the growing number of CAPs strongly contradicts the arguments that LECs have an insurmountable competitive advantage in access services or that LECs discriminate against CAPs.

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<sup>9</sup>Interestingly, MCI was originally named after its enabling technology: Microwave Communications, Inc.

<sup>10</sup>A salient example of which was the F.C.C.'s "above-890" spectrum allocation decision, which opened up the potential for MCI and others to use microwave transmission to compete in long distance services.

Once a CAP has built its core fiber ring in a metropolitan area, the incremental cost of serving additional customers is quite low, relative to the potential gain in revenue. Having established strong footholds in downtown urban areas, one should expect continuing rapid growth by CAPs, as they sign up more customers and expand their networks over larger geographic areas. Because CAPs target their entry selectively to high volume, high density business customers (or smaller customers located in the same or adjacent buildings), they can exploit LECs' price averaging requirements. Because CAPs choose not to serve high cost areas, they have a distinct cost advantage over LECs. CAPs can exploit these advantages of asymmetric regulation as they expand into switched access and exchange services as well.

#### D. Exponential Increases in Competition

LECs face substantially greater competition in exchange services, from CAPs, cable TV operators, IXC's and wireless carriers. CAPs have obtained regulatory authorization and begun to provide exchange services, indicating their rapid expansion into switched access and exchange services by adding end office switches to their existing and/or expanded fiber optic rings. IXC's, especially MCI and AT&T, are entering access and exchange services from the "opposite direction," so to speak, as they add access facilities to their extensive, existing switching capabilities. Due to the rapid growth of competitors, their increasing size and resources means they have no disadvantage in obtaining financial, human and technical resources for competing with LECs.

Technological change is increasing the range of services that can be economically provided by each mode of communications, thereby increasing the potential for intermodal competition in communications. During this decade, intermodal competition will greatly intensify in communications, just as it has in transportation (e.g., railroads, motor carriers, waterways, pipelines and air freight). The following developments illustrate the growing potential for intermodal competition:

- Gas and electric utilities: employing optical fiber and wireless technologies to exploit their extensive rights of way, which reach virtually every home and office, to expand into telecommunications services;
- Cable systems operators: deployment of new digital technologies will significantly increase capacity of cable systems, including the capability of two-way communications;
- Cellular carriers: dramatic increases in market penetration and usage shows that cellular service increasingly competes with wireline;
- Personal Communications Services (PCS) deployment: the number of wireless competitors will triple within the next few years;

- Extraterrestrial Wireless: satellite-based communications services, including VSAT, DBS (direct broadcast satellite) and LEOs (low earth-orbiting satellites), will also grow very fast.

Combinations of communications modes through strategic alliances, cross-ownership and intermodal mergers will further facilitate competitive entry and intermodal competition. In addition to the growing size and increasing resources of competitors, most competitors have undertaken a variety of acquisitions, mergers, joint ventures and strategic alliances to further strengthen their competitive positions, as reported in Appendix B. The resulting combinations — especially, BT-MCI-Nextel,<sup>11</sup> AT&T-NCR-McCaw and TCI-Comcast-Cox-Continental-Time-Warner-Teleport — represent potent competitive forces.

By the emergence of these powerful competitors and market forces, the “natural monopoly” of local exchange carriers has been swept away. Unfortunately, the myth of the monopoly remains, perhaps because it serves so well the interests of those who would prefer to compete with local exchange carriers constrained by regulatory restrictions and obligations, while they are not. In this proceeding, the Commission should reap the harvest of competition, by freeing local exchange carriers from regulations that are no longer necessary and increasingly counter-productive.

#### E. Significance of Increasing, but Targeted Competition

LECs already face substantial competition, especially from CAPs in access services, CAPs and PBXs in exchange services, and IXC in interexchange services. They face rapidly increasing competition as CAPs expand further into switched access and exchange services, IXC increasingly offer intraLATA interexchange services; cable companies begin offering access and exchange services; and cellular and PCS carriers become more competitive in providing access and exchange services. With few exceptions, competitors employ selective, targeted entry, aimed at LECs’ most profitable business, which they are easily able to do because revenues and profits are highly concentrated.

Although full scale competition in access and exchange services is inevitable, given technological change, rapidly changing customer demands and strong competitors, competition has not yet developed in all geographic areas to the point where market competition alone will ensure that public policy objectives are achieved. But USTA is not proposing an end to regulation. Rather, rapid increases in

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<sup>11</sup> MCI invested \$1.3B in Nextel Communications. “...an ambitious start-up that’s in position to put yet another kind of wireless phone network - one that uses radio frequencies once assigned to taxi dispatchers - in 45 of the nation’s top 50 markets within a few years. Each of Nextel’s networks would compete with the two local cellular phone services and any new PCS networks.” *USA Today*, March 1, 1994.



competition compel the need to adopt regulatory policies that will provide for a smoother transition to a fully competitive telecommunications environment.

Rapidly increasing competition also means that the Commission has an interest in ensuring that LECs have a fair opportunity to compete in the fastest growing, most profitable market segments. Aggregate market shares can be extremely misleading because some market segments are very attractive to entrants, and are therefore targets of selective entry, while other segments, especially the mass markets of residential, small business and rural customers, are not. If LECs continue to be handicapped in competing for the former market segments, they will be less able to provide low cost, high quality service to the latter market segments. Furthermore, if LECs continue to lose revenues in the most profitable lines of business, they will not have the financial incentives to invest heavily in the telecommunications infrastructure of the nation.

Finally, the appropriate policies for the transition to full competition should recognize the important role that LECs will continue to play during the transition to full competition. Over the past decade, investments by local exchange carriers have been essential to the development of competition in interexchange services. Without substantial investments in improved switching capabilities, for example, there would be no "equal access" to IXCs. Without substantial LEC investments in common channel signaling (SS7), there would be no 800 number portability. For an interim period of several years, LECs will provide key ingredients to the "network of networks," including a means of interconnection and interoperability across the rapidly growing number of competing and cooperating communications networks and services. It is crucial to the national interest in universal service and a ubiquitous information infrastructure that LECs be allowed to compete on even terms.

### **III. Policy Goals and Principles in Price Cap Reform**

#### **A. Public Policies Are Lagging Changes in Technology and Competition**

Given accelerating rates of change in technology, customer needs and competitive conditions, regulatory policies should be forward-looking, anticipate conditions in the industry during the effective period of the policies. Given the rate at which competition is developing, and the increasing competitive handicaps of LECs, policies should accelerate the transition from quasi-competitive to fully competitive markets by removing distortions that bias customer choices and harm competition.

To be successful, regulatory policies must be compatible with conditions in the industry being regulated over the duration of the policies. Expected changes in conditions requires changes in policies. There is a natural tendency to stay with the status quo, even when it is no longer appropriate. In other words, public policies tend to lag behind conditions in the industry. So long as change is occurring slowly and incrementally, the negative effects of lagging policies are minimal. When change is occurring rapidly, and the magnitude of change is large, then the

negative effects of lagging policies increase significantly. In such a case, policy makers are put in a reactive position, playing a game of "catch up, keep up." Then, rather than promoting consumer welfare and economic development, lagging policies hinder the achievement of these goals.

#### B. Implications of Changing Industry Conditions for Price Cap Reform

These changes in industry conditions have two crucial implications for public policy objectives. First, the goals and objectives — the ends — of regulatory policy should reflect the growing importance of telecommunications to the economic welfare of households, businesses and public agencies. This requires that policy makers give added weight to economic efficiency, competition and the economic development effects in considering policy alternatives. Second, in developing and implementing a regulatory framework — the means to achieve those policy objectives — policy makers should take full account of the dynamics of change in telecommunications, on both the supply and demand sides. Policies that worked well in the past, in a markedly different industry environment, will not work well in the current and future environment of telecommunications.

These changed conditions in telecommunications have greatly affected the underlying assumptions of many current regulatory policies. Because it was in place for so long and became so well established, traditional rate of return regulation developed a high degree of institutional inertia. Given the marked changes in industry conditions — and the prospects for even further change ahead — the discrepancies between the conditions upon which traditional regulation was founded and the current conditions have grown to the point that fundamental reforms to price cap regulation are necessary. The most important of these changed conditions are:

Instability of Environment: Rapidly emerging competition in many spheres of telecommunications has increased uncertainty, requiring very high levels of adaptation and adaptability by regulators and regulated companies. Under such unstable, rapidly changing conditions, the static character of traditional administrative regulation is a major liability. The reform of price cap regulation should be homeostatic (i.e., a system that maintains internal stability by automatically compensating for environmental changes).

Rapid, Accelerating Rates of Change: Discontinuous, non-incremental changes in industry conditions make decisions by regulators and regulated companies much more difficult and risky. Forecasts based on historical experience are highly unreliable, with substantial risk due to sudden, unforeseeable change (e.g., early technological obsolescence, entry of a new, unanticipated class of competitors). To cope with uncertainty, the reform of price cap regulation should feature the use of incentives to achieve optimal performance levels.

Inevitability of Competition: As natural monopoly conditions dissipate, growing competition in telecommunications is inevitable. New entrants, firms expanding from related lines of business or firms from other nations buying United States

telecommunications companies have raised the competitive stakes. The reform of price cap regulation should accept increasing competition as a given, attempt to exploit market forces to achieve public policy objectives when possible, and use selective, targeted policy instruments to achieve "non-market" policy objectives. It is critical to note, though, that the economic rationale for pure price caps does not assume full competition for all services in all geographic markets. *If there were full competition for all services, complete deregulation would be the best policy.* Price regulation of not-yet-fully-competitive services or geographic areas is the best policy for the period of transition from partial competition to complete competition. It should also be noted that pricing up to the caps is allowed, but not required under price caps. Given the growing competition for price-capped services over the duration of the plan adopted by the Commission, we should expect that competition, not the price caps, will become the operative limitation on prices.

Rapid Proliferation of New, Varied Services: With technological innovation and changing composition of demand for telecommunications services, the rate of introduction of new products and services is rapidly accelerating. Traditional rate case methods and tariffing processes create burdensome expense and cause substantial delays in bringing some new services to the market. Moreover, as the number of services increases, so too does the importance of cross-elasticities across services and the concomitant need to flexibly price competing and complementary services.

Inherent Limitations of Administrative Controls: Under rapidly changing, highly uncertain conditions, regulators need much more information to set prices, ensure efficient operations, approve investments, establish authorized rates of return and set depreciation rates than is available to them as a practical matter. Under such circumstances, rate of return regulation is unlikely to induce the desired performance, because administrative controls cannot keep pace with markets and technological change. Market forces are very powerful; they can and will overpower dysfunctional administrative controls, but substantial dislocation and inefficiency will be caused in the process.

### C. Telecommunications Policy Objectives and Goals

In General Issues #1, the Commission appropriately asks whether it should "revise the goals of the LEC price cap plan so that the plan may better achieve the purposes of the Communications Act and the public interest, and if so what should be the revised goals." This section proposes a set of policy goals and objectives that are entirely consistent with the principles enumerated by the Clinton Administration for building the National Information Infrastructure:

"Within the national boundaries of the U.S., we aspire to build our information highways according to a set of principles that I (Albert Gore, Jr.) outlined in January in California. The National Information Infrastructure, as we call it, will be built and maintained by the private sector. It will consist of hundreds of different networks, run by different companies and using different technologies, all connected together in

a giant "network of networks," providing telephone and interactive digital video to almost every American. Our plan is based on five principles: First, encourage private investment; second, promote competition; third, create a flexible regulatory framework that can keep pace with rapid technological and market changes; fourth, provide open access to the network for all information providers; and fifth, ensure universal service."<sup>12</sup>

Universal service. Because competitors target the most lucrative customers and market segments while LECs are obligated to provide universal service, the combination of competition and asymmetric regulation will put growing pressure on universal service. The nation needs policies that will ensure the affordability of access and local service in a competitive environment, without distorting competition. Achieving this objective requires competition-neutral funding of universal service obligations because LECs' customers should not have to bear a disproportionate share of the cost of universal service.

Technical Efficiency: Technical, or "first-order" economic efficiency refers to making the best use of inputs in the production of outputs. The U.S. can no longer afford the "luxury" of public policies which fail to promote economic efficiency objectives. Either we elevate efficiency goals to make better use of economic resources or we will have to do with fewer resources to meet other economic and social objectives. Technical efficiency is maximized when companies and their employees minimize costs while maintaining or improving quality. Reducing unnecessary regulations improves efficiencies in the administrative process. Removing regulations that inhibit LECs from making the fullest, most efficient use of their network capacities, or that attract uneconomic entry, also promote technical efficiency.

Allocative Efficiency: Allocative or "second-order" economic efficiency refers to best use of outputs. Prices play a critical role as signals of the cost and value of goods and services. That means allowing market forces to set prices or, if regulated, allowing prices to reflect market factors to achieve allocative efficiency. Policies that prevent prices from reflecting economic costs and demand conditions are directly contrary to allocative efficiency.

Dynamic Efficiency: Dynamic efficiency refers to the optimal development, deployment and adoption of new technologies. Innovation is the most potent force in telecommunications. Over the years, innovation has brought down the real prices of telecommunications services and made competition feasible. Technology-neutral policies facilitate innovation and the adoption of better technologies, ensuring that users will obtain the benefits of innovation, through lower costs and new services. Regulatory policy can also promote innovation by enabling the rapid introduction of new services to meet customer needs and by allowing greater pricing flexibility for discretionary services.

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<sup>12</sup>Text of speech by Vice President Albert Gore, Jr., March 21, 1994, meeting of the International Telecommunications Union, Buenos Aires, Argentina.

Balanced, Efficient Competition: Strictly speaking, competition is not a policy objective, but a means for achieving other objectives. Still, because there is such a strong consensus in the United States that competition is desirable, policy makers have often elevated competition to a goal of regulation. Unfortunately, there is a tendency to confuse two quite different policy approaches: one that promotes competition versus one that protects competitors, even if at the expense of competitors. There is a corollary tendency, to continue regulating incumbent carriers while actively encouraging entry by new carriers. While there is a valid basis for some differences in regulatory treatment based on differential competitive positions, the current limitations on LECs cannot be justified in pro-competitive terms. To achieve balanced, efficient competition, regulations should not handicap incumbents from competing with their rivals.

Infrastructure Investment: Historically, United States policies toward public infrastructure industries have incorporated — if only implicitly — economic developmental goals. Accordingly, the United States has been an international leader in public infrastructure investments, which have played a significant role in the nation's economic growth and global leadership over the past several decades. Unfortunately, public recognition of similar economic benefits from private infrastructure investment has lagged behind. Only recently, have United States policy makers begun to take sufficient notice of the potential contributions of telecommunications to broader economic policy objectives. Elevating the importance of infrastructure investment as a policy objective can improve the performance of telecommunications industries and the nation's economy. Public policies that promote competition and use economic incentives rather than administrative controls will stimulate prudent investment by LECs. At the same time, the Commission must recognize that, absent appropriate financial prospects, LECs cannot undertake the risks of investing in the NII, especially when they suffer competitive disadvantage from bearing a disproportionate share of the burden of meeting social policy objectives.

Good public policy decisions often require making tradeoffs among competing objectives. There will be times when some policy objectives conflict with others; good policy recognizes and balances among multiple policy objectives. Policy makers should not assume these tradeoffs are inevitable in all cases, however. The art of designing outstanding policies involves finding ways to reduce the tradeoff, to get more equity and more efficiency. Properly designed and implemented, policies can reduce tradeoffs among competing objectives; the resulting improvements in performance can generate increased efficiency and also pay an equity "dividend." The USTA price cap reform proposals would have this effect.

#### D. Public Policy Principles for Reforming Price Cap Regulation

In light of the changing conditions in telecommunications, as described in Section II., and the public policy goals and objectives outlined above, one can derive a set of principles which should guide the design, evaluation and adoption of price cap reforms:

Substitute Competition for Regulation. Customer choices among competitive service providers constitute the best form of "regulation." While competition will increase whether regulators want it or not, good regulatory policy can ensure that competition proceeds more fairly and that all customers enjoy the benefits of competition. Also, good regulatory policy can promote the right kind of competition, that which responds to real market demands and reflects real economic efficiencies. Regulators should avoid policies that stimulate artificial competition wherein entrants exploit regulatory distortions and arbitrage uneconomic pricing schemes.

Promote Competitive Neutrality. Because technology is proceeding at breathtaking speeds and advanced telecommunications are becoming absolutely crucial to competitive success in more and more industries, it is vital to the nation's economy that the Commission continue its progressive record by adopting policies that promote continued development of healthy competition while ensuring that social policy objectives, such as universal service, are maintained. That means that regulatory policies should be competitively neutral. Policies that treat competitors differently can artificially bias customers' choices and distort entry and investment decisions. Policies should provide competitors with a fair opportunity to compete, but should not attempt to guarantee their success. That means policies should promote and protect competition, not protect competitors from competition. While LECs should not receive preferential treatment, it is important that they be treated fairly, because they will continue to serve, through the transition period to full competition, as the ubiquitous network for the mass market of small business and residential users and as the network of networks, providing interconnection and interoperability across competitors.

Facilitate Market Responsiveness: Public policies should attempt to be responsive to current and expected market conditions in the industry being regulated and in related industries. Prices, as signals of cost and value, play a critical role in market exchange. Therefore, regulators should allow prices to be set by market forces whenever possible, or, alternatively, emulate market forces when they do set prices (or pricing parameters). Similarly, regulators should allow, to the maximum extent possible, market forces to determine what variety of services will be offered. Regulators should recognize that market pressures increase the rewards of good public policies (i.e., those which stimulate investment, increase usage and promote economic development) and the costs of policies that are not consonant with market conditions (e.g., those which stimulate uneconomic entry and imbalanced competition).

Synchronize Regulatory and Competition Policies. It is also important that rate regulation and competition policy are synchronized. As technological forces and competition policies further open markets to competitive entry, regulatory policies should be reformed to ensure that they are consistent with actual and expected conditions in the marketplace. For competition policy to work well, pricing should be market driven with only limited, targeted exceptions. Competition policies should recognize when, and the degree to which, prices are not market-driven. In the best

case, prices are regulated only when competition or customer discretion is inadequate to protect buyers from the exercise of market power.

Make Price Cap Regulation More Adaptive and More Flexible. Rapid changes and growing differences in telecommunications markets and technology require policies that are adaptive. An adaptive policy is one that enables change to occur more or less automatically as market conditions change.<sup>13</sup> For example, under a system for classifying market areas as transitional or competitive, a given market area can be moved from one category to the next as competition increases. Enabling LECs to deaverage their access prices in response to changing market conditions is another important source of adaptiveness under price caps. When these kinds of changes occur within the regulatory framework (versus requiring a change of the regulatory framework), then regulation is adaptive to changing conditions. Because economic conditions will continue to change in telecommunications — if anything, even more rapidly than in the past — regulation must change along with it. Unless the reforms the Commission implements now are adaptive, it will be forced to “go back to the drawing boards” as soon as it becomes evident that a non-adaptive price cap plan is no longer working. An appropriate regulatory plan should also be flexible, by encouraging enterprises to respond quickly to different customer needs and competitive conditions by offering different prices and trying product offerings. Flexibility has three complementary meanings: (1) agility: the ability to move quickly, change course, take advantage of opportunity or avoid a threat; (2) versatility: the ability to do different things and apply different capabilities in different situations; and (3) resilience: the ability to absorb shocks and withstand perturbations.<sup>14</sup>

Shift Risks of Network Investments to Shareholders. Rate of return — or earnings sharing — regulation is a social contract between the nation (or state), acting through its agent, the regulatory commission, and the regulated company. The state granted the company an exclusive franchise to provide telephone service and guaranteed the company an opportunity to earn a return on its investment at or

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<sup>13</sup>As an example of “adaptiveness in design,” consider how boat piers were historically built. It used to be that docks were fastened directly to their supporting pilings. Then, as the water height changed, the position of the pier relative to the height of the boat would change, requiring the use of an adjustable stairway or gangplank to connect the two. In the worst case, the dock was of little value, because the water level had dropped too much, so the walkway was too short. Alternatively, piers can be, and increasingly are designed to enable the dock surface to float up and down with changing water levels by not affixing the dock to its supporting pilings. Then, because the height of the dock automatically adjusts to changing conditions — the height of the water — the elevation of the dock relative to that of the boat remains constant. A dock designed in this manner is adaptive. So too is regulation that allows firms to adjust their prices and services in response to changing economic conditions.

<sup>14</sup>Bahrami suggested the three complementary meanings of “flexibility.” Bahrami found, in her study of high-tech industries, that all three attributes are necessary for success. Bahrami, Homa, “The Emerging Flexible Organization,” California Management Review 34 (no. 4, Summer), 1992, pp. 35-36.

about its cost of capital. In return, the company accepted an obligation to serve all customers in its franchise territory (whether or not the price covered the cost of any given customer or customer class). To meet its service obligation meant raising and investing sufficient capital to meet all customers' demands. At the same time, there was little risk of over-investment or under-investment, so long as the firm earned at or near its cost of capital over the long term. Demand was growing predictably and the regulated firm had all or most of the market.

Under rate of return regulation, neither rates nor depreciation rates meant very much, in terms of capital recovery and return on investment. If some services were priced below economic costs, other services could be priced sufficiently above economic costs to meet the "revenue requirement." Similarly, if depreciation rates were less than an economic level (e.g., took insufficient account of technical obsolescence), so that current rates were "too low," then depreciation costs were simply pushed out into the future, and capital was recovered from future customers.

In today's telecommunications environment, there are enormously greater risks facing the regulated firm. First, with growing competition, the regulated firm has to predict not just total demand, but its role in meeting it. Second, with the proliferation of new services and increasing differences across customers, the firm must predict the demand for each potential new service, many of which are cross-elastic with existing or other new services. Third, the regulator cannot ensure that losses can be recovered, since it has little control over how much price competition the regulated firm will face in the marketplace. Fourth, the regulated firm cannot count on recovering its capital investment when depreciation rates are inadequate and competition is certain to grow over time. Even if the regulator were willing to increase future rates to recover past under-depreciation, that is no assurance that the regulated firm could successfully compete with those prices in the market. Fifth, there has been an enormous increase in technological uncertainty. Not only is the rate of technological change much more rapid than in the past, the direction of change is also much more uncertain.

For these reasons, an essential feature of a good price cap plan is that it recognize the increasing riskiness of investment decisions; protect customers from the risk of investments that turn out to be uneconomic or unsuccessful; and provide shareholders new incentives to attract sufficient investment in the public switched telephone network. To meet those objectives, the plan must offer a symmetric risk-reward incentive structure, i.e., one that shifts both the risks of poor investment decisions and the rewards of good investment decisions to shareholders.



#### IV. Economic Rationale for USTA's Price Cap Reform Proposals: Baseline Issues

##### A. End Earnings Sharing and Low-end Adjustment<sup>15</sup>

The only theoretical rationale for earnings sharing is as a "backstop" against the possibility of a productivity offset that is set too low.<sup>16</sup> While theoretically plausible, there are two serious problems with that rationale. The idea is that, if LECs were to earn high profits under price caps, it must be because the price cap mechanism is too high (i.e., the productivity offset is too low), so sharing provides an automatic method of adjustment to return profits to "where they should be." The first problem is that, with uneconomic depreciation rates, the reported rate of return is a highly biased measure of profitability. The second problem is that high profits do not necessarily mean that the price cap formula was incorrect: it may simply mean that the LEC did extremely well in the marketplace and/or in managing its business efficiently. There are companies, in unregulated, competitive markets, which earn high rates of return in some periods. Why should we expect that it could not happen in local exchange telecommunications?

Since there is no good economic rationale for continuing to regulate LECs' rates of return, the FCC should eliminate the earnings sharing and low-end adjustment provisions and discontinue prescription of depreciation rates. Price cap regulation with earning sharing is actually a variant of traditional rate of return regulation. That is, the regulator continues to regulate both prices and rate of return in the traditional fashion. There are four main flaws in earnings sharing:

First, sharing must be symmetrical,<sup>17</sup> yet low-end adjustments leave customers at risk, since they "share" in any under-earnings by the regulated firm. That means that customers would share in the costs of unsuccessful investments and/or inefficient management. Nor are these risks merely a matter of poor management decisions. As Professor Eli Noam (former New York Public Services Commissioner) has noted:

"There are no clear-cut answers in this industry. You will never again get to that point. Managers and planners will have to make some hard choices. And some of them are going to be wrong."<sup>18</sup>

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<sup>15</sup>This sub-section addresses Baseline Issue #4.

<sup>16</sup>This is the reason given by the Commission for the sharing provision in the current LEC Price Cap plan.

<sup>17</sup>The worst possible risk-reward function, from investors' perspective, would be sharing or capping profits upward, but leaving shareholders at risk in the downward direction.

<sup>18</sup>Quoted in "Copper or fiber? Place your bets now," by Carol Wilson, editor. Telephony, November 16, 1992, page 12.